AMENDMENTS TO THE CLAIMS

1. (Original) A temperature measurement circuit, comprising:

two signal channels that are configured to receive, at first and second sense nodes, a differential input signal from a dual junction temperature sensor circuit, and further configured to provide a differential intermediate signal from the differential input signal;

two current source circuits configured to provide respective bias currents to the first and second sense nodes;

a conversion circuit that is configured to convert the differential intermediate signal into a digital temperature signal that is associated with a remote temperature; and

a first multiplexer circuit that is configured to control the differential intermediate signal.

2. (Original) The temperature measurement circuit of Claim 1, wherein the conversion circuit includes a sigma-delta analog-to-digital converter circuit, and wherein the sigma-delta analog-to-digital converter circuit includes:

an operational amplifier circuit; and

a switched capacitor circuit that is responsive to a control signal, wherein the switched capacitor includes first and second capacitors, and wherein:

if the control signal corresponds to the first logic level:

the first capacitor is configured to operate as an integrator with positive gain, and the second capacitor is configured to operate as an integrator with negative gain; and

if the control signal corresponds to the second logic level:

the first capacitor is configured to operate as an integrator with negative gain, and the second capacitor is configured to operate as an integrator with positive gain.

3. (Original) The temperature measurement circuit of Claim 1, wherein the first multiplexer circuit is configured to control the differential intermediate signal by multiplexing the two signal channels.

4. (Previously Presented) A temperature measurement circuit, comprising:

two signal channels that are configured to receive, at first and second sense nodes, a differential input signal from a dual junction temperature sensor circuit, and further configured to provide a differential intermediate signal from the differential input signal;

two current source circuits configured to provide respective bias currents to the first and second sense nodes;

a conversion circuit that is configured to convert the differential intermediate signal into a digital temperature signal that is associated with a remote temperature;

a first multiplexer circuit that is configured to control the differential intermediate signal, wherein the first multiplexer circuit is configured to control the differential intermediate signal by multiplexing the two signal channels;

a first buffer circuit coupled between the first multiplexer circuit and the first sense node;

a second buffer circuit coupled between the first multiplexer circuit and the second sense node; and

another multiplexer circuit that is coupled between the first and second sense nodes and the first and second buffer circuits.

5. (Original) The temperature measurement circuit of Claim 1, wherein the multiplexer circuit is configured to control the differential intermediate signal by multiplexing which one of the bias currents is provided to which one of the two signal channels.

6. (Previously Presented) A temperature measurement circuit, comprising:

two signal channels that are configured to receive, at first and second sense nodes, a differential input signal from a dual junction temperature sensor circuit, and further configured to provide a differential intermediate signal from the differential input signal;

two current source circuits configured to provide respective bias currents to the first and second sense nodes;

a conversion circuit that is configured to convert the differential intermediate signal into a digital temperature signal that is associated with a remote temperature;

a first multiplexer circuit that is configured to control the differential intermediate signal, wherein the multiplexer circuit is configured to control the differential intermediate signal by multiplexing which one of the bias currents is provided to which one of the two signal channels; and

a control circuit that is configured to provide a first control signal such that the first control signal corresponds to a first logic level at a first time, and a second logic level at a second time, wherein the first multiplexer circuit is configured to receive a first control signal, and wherein the first multiplexer circuit is arranged such that multiplexing which one of the bias currents is provided to which one of the two signal channels is selected according to the first control signal, and wherein the differential intermediate signal includes a first differential voltage at the first time, and a second differential voltage at the second time.

7. (Original) The temperature measurement circuit of Claim 6, wherein the conversion circuit is configured to provide the digital temperature signal such that the digital temperature signal is derived from an average of the first differential voltage and the second differential voltage.

8. (Original) The temperature measurement circuit of Claim 6, further comprising:

a second multiplexer circuit that is coupled between the first and second sense nodes and the conversion circuit, wherein the second multiplexer circuit is responsive to a second control signal.

9. (Original) The temperature measurement circuit of Claim 8, wherein the control circuit is configured to:

provide the first control signal such that the first control signal corresponds to:

the first logic level at a third time, and

the second logic level at a fourth time, and

provide the second control signal such that the second control signal corresponds to:

the first logic level at the first and second times, and

the second logic level at the third and fourth times.

10. (Original) The temperature measurement circuit of Claim 9,

wherein the differential intermediate signal includes a third differential voltage at the third time, and includes a fourth differential voltage at the fourth time, and wherein

the conversion circuit is further configured to provide the digital temperature signal such that the digital temperature signal is associated with the first differential voltage plus the third differential voltage minus the second differential voltage minus the fourth differential voltage, all divided by four.

11. (Original) A temperature measurement circuit; comprising:

a control circuit that is configured to provide a current control signal;

a sensing circuit that is configured to receive, at first and second sense nodes, a differential input signal from a dual junction temperature sensor circuit, and further configured to provide a differential intermediate signal from the differential input signal, wherein the sensing circuit includes:

a first current source circuit that is configured to provide a first bias current, wherein the first bias current corresponds to one of a first value if the current control signal corresponds to a deasserted value, and corresponds to a second value if the current control signal corresponds to an asserted value;

a second current source circuit that is configured to provide a second bias current such that the second bias current corresponds to a third value if the current control signal corresponds to the deasserted value, and corresponds to a fourth value if the current control signal corresponds to an asserted value,

wherein the differential intermediate signal includes a differential voltage that depends at least in part on the current control signal; and

a conversion circuit that is configured to convert the differential intermediate signal into a digital temperature signal that is associated with a remote temperature.

12. (Original) The temperature measurement circuit of Claim 11, wherein the conversion circuit includes a sigma-delta analog-to-digital converter circuit, and wherein the sigma-delta analog-to-digital converter circuit includes:

an operational amplifier circuit that is configured to receive an amplifier input signal; and

a switched capacitor circuit that is responsive to another control signal, wherein conversion circuit is configured to provide the amplifier input signal such that the amplifier input signal corresponds to a first voltage if the other control signal corresponds to a first logic level, and corresponds to a second voltage if the control signal corresponds to a second logic level, and wherein the conversion circuit is further configured to substantially cancel a capacitor mismatch in the switched capacitor circuit based on the first and second voltages.

13. (Original) The temperature measurement circuit of Claim 11, wherein the conversion circuit is configured to substantially cancel effects of a resistance mismatch by deriving the digital temperature signal at least in part from:

the differential voltage when the current control signal is asserted,

the differential voltage when the current control signal is deasserted, and

a ratio b:a of the second value to the first value, wherein the second current source circuit is configured such that the ratio of the fourth value to the third value is approximately b:a.

14. (Original) The temperature measurement circuit of Claim 13, wherein the conversion circuit is configured to derive the digital temperature signal by employing a mathematical algorithm, wherein the mathematical algorithm is (b*Vdiffa-a *Vdiffb)/(b*a), Vdiffa represents the differential voltage when the control signal is deasserted, Vdiffb represent the differential voltage when the control signal is asserted.

15. (Original) The circuit of Claim 13, wherein the ratio of the second value to the first value is approximately two to one.

16. (Original) The temperature measurement circuit of Claim 11, wherein the sensing circuit further includes:

a first multiplexer circuit that is configured to multiplex, responsive to a first control signal, which of the first and second current source circuits is coupled to which of the first and second sense nodes.

17. (Original) The temperature measurement circuit of Claim 16, wherein the sensing circuit further includes:

a second multiplexer circuit that is coupled between the first and second sense nodes and the conversion circuit, wherein the second multiplexer circuit is responsive to a second control signal, and wherein the control circuit is further configured to provide the first and second control signals.

18. (Original) The temperature measurement circuit of Claim 17, wherein the sensing circuit further includes:

a first buffer circuit that is coupled between the first sense node and the second multiplexer circuit; and

a second buffer circuit that is coupled between the second sense node and the second multiplexer circuit;

a third multiplexer circuit that is coupled between the first and second sense nodes and the first and second buffer circuits, wherein the third multiplexer circuit is responsive to a third control signal, and wherein the control circuit is configured to provide the third control signal.

19. (Original) The differential remote temperature circuit of Claim 18, wherein the control circuit is arranged to provide the first, second, third, and current control signals such that the differential signal corresponds to each of sixteen different differential voltages at different times depending on the logic level of the first, second, third, and current control signals, and wherein the conversion circuit is configured to derive the digital temperature signal based on the sixteen different differential voltages.

20. (Previously Presented) A temperature measurement circuit, comprising:

means for providing a differential intermediate signal from a differential input signal, wherein the means for providing includes:

means for providing a first bias current; and

means for providing a second bias current;

means for converting the differential intermediate signal into a temperature signal that is related to a temperature of a remote device such that the temperature of the remote device is calculated based on a voltage difference between two pn junctions; and

means for substantially canceling at least one of:

at least one voltage offset that is included the means for providing;

at least one voltage offset that is included in the means for converting;

a capacitance mismatch that is included in the means for converting;

a resistance mismatch that is associated with the remote device;

another resistance mismatch that is associated with signals lines that are coupled between the remote device and the means for providing; or

a current mismatch between the first and second bias currents.

21. (Currently amended) The circuit of Claim 1, wherein the conversion circuit is configured to provide the digital temperature signal such that the remote temperature is calculated based on a voltage difference between the two pn junctions in the dual junction temperature sensor.

22. (Currently amended) A temperature measurement circuit, comprising:

two signal channels that are configured to receive, at first and second sense nodes, a differential input signal from a dual junction temperature sensor circuit, and further configured to provide a differential intermediate signal from the differential input signal;

two current source circuits configured to provide respective bias currents to the first and second sense nodes;

a conversion circuit that is configured to convert the differential intermediate signal into a digital temperature signal that is associated with a remote temperature; and

a first multiplexer circuit that is configured to control the differential intermediate signal~~The circuit of Claim 1~~, wherein the two signal channels are configured to receive the differential input signal from two separate pn junctions of the dual junction temperature sensor circuit, such that a first half of the differential input signal is provided from one of the two separate pn junctions, a second half of the differential input signal is provided from the other of the two separate pn junctions, and such that the differential input signal is based on a voltage difference between the two separate pn junctions.

23. (Currently amended) A temperature measurement circuit, comprising:

two signal channels that are configured to receive, at first and second sense nodes, a differential input signal from a dual junction temperature sensor circuit, and further configured to provide a differential intermediate signal from the differential input signal;

two current source circuits configured to provide respective bias currents to the first and second sense nodes;

a conversion circuit that is configured to convert the differential intermediate signal into a digital temperature signal that is associated with a remote temperature; and

a first multiplexer circuit that is configured to control the differential intermediate signal~~The circuit of Claim 1~~, wherein the multiplexer circuit is a two-by-two multiplexer circuit.

24. (Currently amended) The temperature measurement circuit of Claim 23, wherein the multiplexer circuit is configured to control the differential intermediate signal by multiplexing whether a first of the two bias currents is provided to ~~the~~ a first of the two signal channels and a second of the two bias current is provided to a second of the two signal channels, or vice versa.